

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 11, 12, 14-16, 18-20, 22 and 24-46 are presented for consideration. Claims 11, 18, 27 and 28 are independent. Claims 11, 18, 27 and 28 have been amended to clarify features of the invention, while claims 43-46 have been added to recite additional features of the invention. Support for these changes and claims can be found in the application, as filed. Therefore, no new matter has been added.

Applicant requests favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 11, 12, 18, 20, 27, 28, 30, 32 and 34-37 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,986,733 to Winker et al. in view of Japanese patent document no. 8-107060 (the “‘060 document”). Claims 19, 26, 29, 40 and 42 were rejected under 35 U.S.C. § 103 as being unpatentable over the Winker et al. patent in view of the ‘060 document and further in view of U.S. Patent No. 5,892,573 to Takahashi et al. Claims 16, 24, 25, 31 and 33 were rejected under 35 U.S.C. § 103 as being unpatentable over the Winker et al. patent in view of the ‘060 document and further in view of U.S. Patent No. 6,055,053 to Lesniak. Claim 41 was rejected under 35 U.S.C. § 103 as being unpatentable over the Winker et al. patent in view of the ‘060 document, the Lesniak patent and further in view of the Takahashi et al. patent. Claims 14, 15, 22, 38 and 39 were rejected under 35 U.S.C. § 103 as being unpatentable over the Winker et al. patent in view of the ‘060 document and further in view of the Aoyama et

al. article. Applicant submits that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as previously recited in claims 11, 12, 14-16, 18-20, 22 and 24-42. Therefore, these rejections are respectfully traversed. Nevertheless, Applicant submits that independent claims 11, 18, 27 and 28, for example, amplify the distinctions between the present invention and the cited.

In one aspect of the invention, independent claim 11 recites a projection optical system that includes a plurality of lenses that cause birefringence and at least one optical element for substantially eliminating the birefringence caused by the plurality of lenses. The at least one optical element is disposed between the plurality of lenses and an image plane of the projection optical system.

In another aspect of the invention, independent claim 18 recites a projection exposure apparatus that includes an illumination system for illuminating a reticle with light and a projection optical system for projecting a pattern of the reticle onto a wafer. The projection optical system includes those features discussed above with respect to independent claim 11.

In still another aspect of the invention, independent claim 27 recites a projection optical system that includes a plurality of lenses that cause birefringence and at least one optical element for substantially eliminating the birefringence caused by the plurality of lenses. The at least one optical element is disposed near a pupil of the projection optical system.

In yet another aspect of the invention, independent claim 28 recites a step-and-scan type projection exposure apparatus that includes an illumination system for illuminating a reticle with light and a projection optical system for projecting a pattern of the reticle onto a wafer. The

projection optical system includes those features discussed above with respect to independent claim 27.

Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest such features of the present invention, as recited in independent claims 11, 18, 27 and 28.

The Examiner relies on the Winker et al. patent for teaching lenses or an optical element that cause birefringence and at least one optical element for substantially eliminating the birefringence of those elements. The Examiner relies on the '060 document for teaching a projection exposure apparatus with an illumination system, a reticle, a projection optical system and a wafer, in which birefringence is minimized. Applicant submits, however, that neither the Winker et al. patent nor the '060 document teaches or suggests the salient features of Applicant's present invention, as recited in the independent claims in which the at least one optical element is disposed between the plurality of lenses and an image plane of the projection optical system (independent claims 11 and 18) or the at least one optical element is disposed near a pupil of the projection optical system (independent claims 27 and 28).

Applicant further submits that the remaining art cited does not cure the deficiencies noted above with respect to the Winker et al. patent and the '060 document.

The Examiner relies on the Takahashi et al. patent for teaching illumination of a reticle with slit-like light and scanning a wafer and the reticle at a speed ratio corresponding to the magnification.

The Examiner relies on the Lesniak patent for teaching an optical system which exhibits birefringence due to a stress distribution and the Aoyama et al. article for teaching that form birefringence is produced using ultra-high spatial frequency gratings with a period smaller than the wavelength used.

Applicant submits that none of these secondary citations, however, teaches or suggests the salient features of Applicant's present invention, as recited in independent claims 11, 18, 27 and 28, which have been discussed above. Therefore, those citations add nothing to the teachings of the Winker et al. patent or the '060 document that would render obvious Applicant's present invention recited in those independent claims.

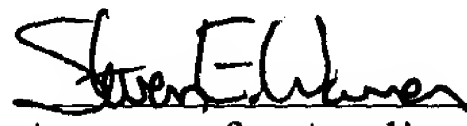
For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 11, 18, 27 and 28, is patentably defined over the cited art, whether that art is taken individually or in combination.

The dependent claims also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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